

CLAIMS

WHAT IS CLAIMED IS:

1. A method of forming a gas impermeable joint in a fluid system, the method comprising:
 - providing a tube having a metallic barrier layer disposed between an inner plastic layer and an outer plastic layer;
 - forcing at least one of the inner plastic layer and the outer plastic layer into contact with a plastic surface of a component;
 - welding the at least one of the inner plastic layer and the outer plastic layer with the plastic surface to form the gas impermeable joint.
2. The method of claim 1, wherein the welding includes at least one of: spin welding, hot plate welding, vibration welding, and ultrasonic welding.
3. The method of claim 1, wherein the component includes a recess disposed therein, the recess being dimensioned to receive an end of the tube, and the plastic surface of the component being formed within the recess to contact the at least one of the inner plastic layer and the outer plastic layer.
4. The method of claim 1, wherein the component includes a cylindrical protrusion, the plastic surface being formed on an outer circumference of the cylindrical protrusion.
5. The method of claim 1, wherein the component includes a cylindrical protrusion, the plastic surface being formed on an inner circumference of the cylindrical protrusion.
6. The method of claim 1, wherein the thickness of the at least one of the inner plastic layer and the outer plastic layer before welding is greater than about 0.6 millimeters.

7. The method of claim 6, wherein the thickness of the at least one of the inner plastic layer and the outer plastic layer before welding is greater than about 1 millimeter.

8. The method of claim 1, wherein the thickness of the at least one of the inner plastic layer and the outer plastic layer before welding is between about 0.6 millimeters to about 3 millimeters.

9. The method of claim 1, wherein the thickness of the at least one of the inner plastic layer and the outer plastic layer before welding is between about 1 millimeters to about 3 millimeters.

10. The method of claim 1, wherein the inner plastic layer is formed by a first tube, the metallic barrier is formed by an aluminum foil bonded exteriorly about the first tube, and the outer plastic layer is formed by a second tube bonded exteriorly about the aluminum foil; the first tube and the second tube each comprising about 20 percent by weight of EPDM rubber and from about 2 to 9 percent by weight of polybutadiene-maleic anhydride adduct resin.

11. The method of claim 1, wherein the tube includes a reinforcement layer bonded exteriorly about the outer plastic layer.

12. A fluid system comprising:
a tube having a metallic barrier layer disposed between an inner plastic layer and an outer plastic layer; and
a component in fluid communication with the tube via a joint, wherein at least one of the inner plastic layer and the outer plastic layer is welded to a plastic surface of the component to form the joint.

13. The fluid system of claim 12, wherein the weld between the tube and the component is formed by at least one of: spin welding, hot plate welding, vibration welding, ultrasonic welding.

14. The fluid system of claim 12, wherein the component includes a recess disposed therein, the recess being dimensioned to receive an end of the tube, and the plastic surface of

the component being formed within the annular recess to contact the at least one of the inner plastic layer and the outer plastic layer.

15. The fluid system of claim 12, wherein the component includes a cylindrical protrusion, the plastic surface being formed on an outer circumference of the cylindrical protrusion.

16. The fluid system of claim 12, wherein the component includes a cylindrical protrusion, the plastic surface being formed on an inner circumference of the cylindrical protrusion.

17. The fluid system of claim 12, wherein the thickness of the at least one of the inner plastic layer and the outer plastic layer before welding is greater than about 0.6 millimeters.

18. The fluid system of claim 17, wherein the thickness of the at least one of the inner plastic layer and the outer plastic layer before welding is greater than about 1 millimeter.

19. The fluid system of claim 12, wherein the thickness of the at least one of the inner plastic layer and the outer plastic layer before welding is between about 0.6 millimeters to about 3 millimeters.

20. The fluid system of claim 19, wherein the thickness of the at least one of the inner plastic layer and the outer plastic layer before welding is between about 1 millimeters to about 3 millimeters.

21. The fluid system of claim 12, wherein the inner plastic layer is formed by a first tube, the metallic barrier is formed by an aluminum foil bonded exteriorly about the first tube, and the outer plastic layer is formed by a second tube bonded exteriorly about the aluminum foil; the first tube and the second tube each comprising about 20 percent by weight of EPDM rubber and from about 2 to 9 percent by weight of polybutadiene-maleic anhydride adduct resin.

22. The fluid system of claim 12, wherein the tube includes a reinforcement layer bonded exteriorly about the outer plastic layer.